AMENDMENTS TO THE CLAIMS

Please amend the claims as follows:

Claim 1 (Currently Amended): A method ~~Method~~ of obtaining a gain function from ~~by means of~~ an array of antennae and a weighting of the signals received or to be transmitted by vectors ($\bar{b}$) of N complex coefficients, referred to as weighting vectors, N being the number of antennae in the array, comprising the steps of: ~~characterised in that, a reference gain function being given the said reference gain function is projected orthogonally onto the sub-space of the gain functions generated by the said weighting vectors of the space of the gain functions, previously provided with a norm, and in that there is chosen, as the optimum weighting vector, a weighting vector generating the reference gain function thus projected~~

generating a sub-space which is normed and orthogonal with respect to a space of gain functions, the gain functions being generated by the weighting vectors;

projecting a desired reference function onto the sub-space; and

choosing a weighting vector which generates a gain function approximate to the projection of the desired reference gain function in the sub-space, as an optimum weighting vector.

Claim 2 (Currently Amended): The method ~~Method~~ of obtaining the ~~a reference~~ gain function according to Claim 1, wherein ~~characterised in that~~ the gain functions are represented by vectors ($\bar{G}$)~~,~~ referred to as gain vectors, of M complex samples taken at M distinct angles, defining sampling directions and belonging to the angular range covered by the array, further comprising:

~~the space of the gain functions then being the vector space C^M provided with the Euclidian norm, and in that, for a given frequency (f), the reference gain vector is projected~~

~~onto the vector sub-space (Imf) of the gain vectors generated by the array operating at the said frequency in order to obtain the said optimum weighting vector~~

providing the space of the gain functions being the vector space C^M with an Euclidian norm; and

projecting the reference gain function for a given frequency (f) onto the vector sub-space (Im_f) of the gain vectors generated by the array operating at the frequency in order to obtain the optimum weighting vector.

Claim 3 (Currently Amended): The method ~~Method~~ of obtaining the ~~a reference~~ gain function according to Claim 2, wherein ~~characterised in that~~ M is chosen such that $M > \pi N$.

Claim 4 (Currently Amended): The method ~~Method~~ of obtaining the ~~a reference~~ gain function according to Claim 2 or 3, wherein ~~characterised in that the sampling~~ the M distinct angles are uniformly distributed in the angular range covered by the array.

Claim 5 (Currently Amended): The method ~~Method~~ of obtaining the ~~a reference~~ gain function according to Claim 2, wherein ~~characterised in that~~ the reference gain function is obtained by sampling the reference gain function after an anti-aliasing filtering.

Claim 6 (Currently Amended): The method ~~Method~~ of obtaining the ~~a reference~~ gain function according to Claim 2 ~~one of Claims 2 to 5~~, further comprising: ~~characterised in that,~~

transforming the gain vectors ($\overline{G}$) ~~being the transforms~~ by a linear application (h_s^f) of C^N in C^M of the weighting vectors of the array and Hf being the matrix[[,]] of size M x N[[,]] of the ~~said~~ linear application of a starting base of C^N in an arrival base C^M, the ~~said~~ optimum weighting vector[[,]] for a given frequency f[[,]] is obtained from the reference gain

vector $\overline{G}$ as $\overline{b}=H_f^+\cdot\overline{G}$ ~~where~~ wherein $H_f^+=(H_f^{*T}\cdot H_f)^{-1}\cdot H_f^{*T}$ is the pseudo-inverse matrix of the matrix H_f and where H_f^{*T} is the conjugate transpose of the matrix H_f.

Claim 7 (Currently Amended): The method ~~Method~~ of obtaining the ~~a reference~~ gain function according to Claim 6, wherein ~~characterised in that, the~~ said starting base being that of the vectors $\overline{e}_k$, k=0,..,N-1, such that $\overline{e}_k=(e_k,0,e_k,1,..,e_k,N-1)^T$ with

$$e_{k,i}=\exp(j\cdot\frac{2\pi fd}{c}\cdot i\cdot\sin\theta_k)$$ and $\theta_k=k\pi/N,\ k=-(N-1)/2,...,0,..,(N-1)/2$ and the arrival base being a canonical base, the matrix H_f ~~has as its~~ having the components:

$$H_{pq}=\exp(j(N-1)\Psi_{pq}/2\cdot\frac{\sin(N\Psi_{pq}/2)}{\sin(\Psi_{pq}/2)}$$ with $\Psi_{pq}=\pi\eta(\sin(p\pi/N)-\sin(q\pi/M)$ and

$\eta=f/f_0$ with $f_0=c/2d$, d being the pitch of the array.

Claim 8 (Currently Amended): The method ~~Method~~ of obtaining the ~~a reference~~ gain function according to Claim 6 ~~or 7~~, ~~characterised in that~~ wherein the reference gain vector is obtained by sampling the gain function generated at a first operating frequency f_1 of the array by using ~~means of~~ a first weighting vector $\overline{b}_1$ and ~~in that~~ wherein the optimum weighting gain vector for a second frequency f_2 is obtained by $\overline{b}_2=H_{f2}^+\cdot H_{f1}\cdot\overline{b}_1$.

Claim 9 (Currently Amended): The method ~~Method~~ of obtaining the ~~a reference~~ gain function according to Claim 8, ~~characterised in that~~ wherein the operating frequency f_1 of the array is the frequency of an uplink between a mobile terminal and a base station in a mobile telecommunication system and in that the operating frequency f_2 of the array is the frequency of a downlink between the ~~said~~ base station and the ~~said~~ mobile terminal.

Claim 10 (New): The method of obtaining the gain function according to Claim 7, wherein the reference gain vector is obtained by sampling the gain function generated at a first operating frequency f_1 of the array using a first weighting vector $\overline{b_1}$ and wherein the optimum weighting gain vector for a second frequency f_2 is obtained by $\overline{b_2} = H_{f2}^{+} \cdot H_{f1} \cdot \overline{b_1}$.

Claim 11 (New): The method of obtaining the gain function according to Claim 3, further comprising:

transforming the gain vectors ($\overline{G}$) by a linear application (h_s^f) of C^N in C^M of the weighting vectors of the array and H_f being a matrix of size M x N of the linear application of a starting base of C^N in an arrival base C^M, the optimum weighting vector for a given frequency f is obtained from the reference gain vector $\overline{G}$ as $\overline{b} = H_f^{+} \cdot \overline{G}$ wherein $H_f^{+} = (H_f^{*T} \cdot H_f)^{-1} \cdot H_f^{*T}$ is the pseudo-inverse matrix of the matrix H_f and where H_f^{*T} is the conjugate transpose of the matrix H_f.

Claim 12 (New): The method of obtaining the gain function according to Claim 1, wherein the norm provided to the vector space is an Euclidian norm.

Claim 13 (New): The method of obtaining the gain function according to Claim 2, further comprising:

approximating a vector of samples of the reference gain function by using a linear combination of base vectors.

Claim 14 (New): The method of obtaining the gain function according to Claim 1, wherein the array of antennae is a circular array.